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Medical Encyclopedia: Multiple sclerosis

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Alternative names

MS

Definition

Multiple sclerosis is an autoimmune disease that affects the central nervous system (the brain and spinal cord).

Causes, incidence, and risk factors

Multiple sclerosis (MS) usually affects woman more than men. The disorder most commonly begins between ages 20 and 40, but can strike at any age.

The exact cause is not known, but MS is believed to result from damage to the myelin sheath, the protective material which surrounds nerve cells. It is a progressive disease, meaning the damage gets worse over time. Inflammation destroys the myelin, leaving multiple areas of scar tissue (sclerosis). The inflammation occurs when the body's own immune cells attack the nervous system.

The inflammation causes nerve impulses to slow down or become blocked, leading to the symptoms of MS. Repeated episodes, or flare ups, of inflammation can occur along any area of the brain and spinal cord.

Symptoms vary because the location and extent of each attack varies. Usually episodes that last days, weeks, or months alternate with times of reduced or no symptoms (remission).

Recurrence (relapse) is common although non-stop progression without periods of remission may also occur.

Researchers are not sure what triggers an attack. Patients with MS typically have a higher number of immune cells than a healthy person, which suggests that an immune response might play a role. The most common theories point to a virus or genetic defect, or a combination of both. There also appears to be a genetic link to the disease. MS is more likely to occur in northern Europe, the northern United States, southern Australia, and New Zealand than in other areas. Geographic studies indicate there may be an environmental factor involved.

People with a family history of MS and those who live in a geographical area with a higher incidence rate for MS have a higher risk of the disease.

Symptoms

- weakness of one or more extremities
- paralysis of one or more extremities
- tremor of one or more extremities
- muscle spasticity (uncontrollable spasm of muscle groups)
- muscle atrophy

- movement, dysfunctional - slowly progressive; beginning in the legs
- numbness or abnormal sensation in any area
- tingling
- facial pain
- extremity pain
- loss of vision -- usually affects one eye at a time
- double vision
- eye discomfort
- uncontrollable rapid eye movements
- eye symptoms worsen on movement of the eyes
- decreased coordination
- loss of balance
- decreased ability to control small or intricate movements
- walking/gait abnormalities
- muscle spasms (especially in the legs)
- dizziness
- vertigo
- urinary hesitancy, difficult to begin urinating
- strong urge to urinate (urinary urgency)
- frequent need to urinate (urinary frequency)
- incontinence (leakage of urine, loss of control over urination)
- decreased memory
- decreased spontaneity
- decreased judgment
- loss of ability to think abstractly
- loss of ability to generalize
- depression
- decreased attention span
- slurred speech
- difficulty speaking or understanding speech
- fatigue, tired easily

Additional symptoms that may be associated with this disease:

- constipation
- hearing loss
- positive Babinski's reflex

Note: Symptoms may vary with each attack. They may last days to months, then reduce or disappear, then recur periodically. With each recurrence, the symptoms are different as new areas are affected. Fever can trigger or worsen attacks, as can hot baths, sun exposure, and stress.

Signs and tests

Symptoms of MS may mimic many other neurologic disorders. Diagnosis is made by ruling out other conditions.

A history of at least two attacks separated by a period of reduced or no symptoms may indicate one pattern of attack/remission seen in MS (known as relapsing-remitting pattern). If there are observable decreases in any functions of the central nervous system (such as abnormal reflexes), the diagnosis of MS may be suspected.

Examination by the health care provider may show focal neurologic deficits (localized decreases in function). This may include decreased or abnormal sensation, decreased ability to move a part of the body, speech or vision

changes, or other loss of neurologic functions. The type of neurologic deficits usually indicates the location of the damage to the nerves.

Eye examination may show abnormal pupil responses, changes in the visual fields or eye movements, nystagmus (rapid eye movements) triggered by movement of the eye, decreased visual acuity, or abnormal findings on a fundoscopy (an examination of the internal structures of the eye).

Tests that indicate or confirm multiple sclerosis include:

- head MRI scan that shows scarring or a new lesion
- spine MRI scan that shows scarring or a new lesion
- lumbar puncture (spinal tap)
- CSF oligoclonal banding
- CSF IgG index

Treatment

There is no known cure for multiple sclerosis at this time. However, there are promising therapies that may slow the disease. The goal of treatment is to control symptoms and maintain a normal quality of life. Types of treatment include:

- Immune modulators. Patients with a relapsing-remitting course of the disease are often placed on an immune modulating therapy. This requires injection under the skin or in the muscle once or several times a week. It may be in the form of interferon (such as Avonex, Betaseron, or Rebif) or another medicine called glatiramer acetate (Copaxone). They are all similar in their effectiveness and the decision on which to use depends on concerns about particular side effects.
- Steroids. Steroids are given to decrease the severity of attacks when they occur. These shut the immune system down to stop cells from causing inflammation.
- Lioresal (Baclofen), tizanidine (Zanaflex), or a benzodiazepine may be used to reduce muscle spasticity.
- Cholinergic medications to reduce urinary problems.
- Antidepressants for mood or behavior symptoms.
- Amantadine for fatigue.
- Physical therapy, speech therapy, occupational therapy, and support groups can help improve the person's outlook, reduce depression, maximize function, and improve coping skills.
- Exercise. A planned exercise program early in the course of the disorder can help maintain muscle tone.

A healthy lifestyle is encouraged, including good general nutrition. Adequate rest and relaxation can help maintain energy levels. Attempts should be made to avoid fatigue, stress, temperature extremes, and illness to reduce factors that may trigger an MS attack.

Support Groups

For additional information, see multiple sclerosis resources.

Expectations (prognosis)

The outcome is variable and unpredictable. Although the disorder is chronic and incurable, life expectancy can be normal or nearly so. Most people with MS continue to walk and function at work with minimal disability for 20 or more years.

The factors felt to best predict a relatively benign course are female gender, young age at onset (less than 30 years), infrequent attacks, a relapsing-remitting pattern, and low burden of disease on imaging studies.

The amount of disability and discomfort varies with the severity and frequency of attacks and the part of the central nervous system affected by each attack. Commonly, there is initially a return to normal or near-normal

function between attacks. As the disorder progresses, there is progressive loss of function with less improvement between attacks.

Complications

- progressive disability
- urinary tract infections
- side effects of medications used to treat the disorder

Calling your health care provider

Call your health care provider if you develop any symptoms of MS, as he or she is the only one who can distinguish multiple sclerosis from other serious disorders such as stroke or infection.

Call your health care provider if symptoms progressively worsen despite treatment.

Call your health care provider if the condition deteriorates to the point where home care is no longer possible.

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Medical Encyclopedia: Parkinson's disease

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Alternative names

Paralysis agitans; Shaking palsy

Definition

Parkinson's disease is a disorder of the brain characterized by shaking (tremor) and difficulty with walking, movement, and coordination. The disease is associated with damage to a part of the brain that is involved with movement.

Causes, incidence, and risk factors

Parkinson's disease was first described in England in 1817 by Dr. James Parkinson. The disease affects approximately 2 of every 1,000 people and most often develops after age 50. It is one of the most common neurologic disorders of the elderly. Sometimes Parkinson's disease occurs in younger adults, but is rarely seen in children. It affects both men and women.

In some cases, Parkinson's disease occurs within families, especially when it affects young people. Most of the cases that occur at an older age have no known cause.

Parkinson's disease occurs when the nerve cells in the part of the brain that controls muscle movement are gradually destroyed. (The damage is progressive, which means it gets worse with time.) The exact reason that the cells of the brain deteriorate is unknown. The disorder may affect one or both sides of the body, with varying degrees of loss of function.

Nerve cells use a brain chemical called dopamine to help send signals back and forth. Damage in the area of the brain that controls muscle movement causes a decrease in dopamine production. Too little dopamine disturbs the balance between nerve-signalling substances (transmitters). Without dopamine, the nerve cells cannot properly send messages. This results in the loss of muscle function.

Some people with Parkinson's disease become severely depressed. This may be due to loss of dopamine in certain brain areas involved with pleasure and mood. Lack of dopamine can also affect motivation and the ability to make voluntary movements.

Early loss of mental capacities is uncommon. However, persons with severe Parkinson's may have overall mental deterioration (including dementia and hallucinations). Dementia can also be a side effect of some of the medications used to treat the disorder.

Parkinson's in children appears to occur when nerves are not as sensitive to dopamine, rather than damage to the area of brain that produces dopamine. Parkinson's in children is rare.

The term "parkinsonism" refers to any condition that involves a combination of the types of changes in movement seen in Parkinson's disease. Parkinsonism may be caused by other disorders (such as secondary parkinsonism)

or certain medications used to treat schizophrenia.

Symptoms

- Muscle rigidity
 - Stiffness
 - Difficulty bending arms or legs
- Unstable, stooped, or slumped-over posture
- Loss of balance
- Gait (walking pattern) changes
- Shuffling walk
- Slow movements
- Difficulty initiating any voluntary movement
 - Difficulty beginning to walk
 - Difficulty getting up from a chair
- Small steps followed by the need to run to maintain balance
- Freezing of movement when the movement is stopped, inability to resume movement
- Muscle aches and pains (myalgia)
- Shaking, tremors (varying degrees, may not be present)
 - Characteristically occur at rest, may occur at any time
 - May become severe enough to interfere with activities
 - May be worse when tired, excited, or stressed
 - Finger-thumb rubbing (pill-rolling tremor) may be present
- Changes in facial expression
 - Reduced ability to show facial expressions
 - "Mask" appearance to face
 - Staring
 - May be unable to close mouth
 - Reduced rate of blinking
- Voice or speech changes
 - Slow speech
 - Low volume
 - Monotone
 - Difficulty speaking
- Loss of fine motor skills
 - Difficulty writing, may be small and illegible
 - Difficulty eating
 - Difficulty with any activity that requires small movements
 - Uncontrolled, slow movement
- Frequent falls
- Decline in intellectual function (may occur, can be severe)
- A variety of gastrointestinal symptoms, mainly constipation.

Note: Initial symptoms may be mild and nonspecific. For instance, the patient may have a mild tremor or a slight feeling that one leg or foot is stiff and dragging.

Additional symptoms that may be associated with this disease:

- Depression
- Confusion
- Dementia

- Seborrhea (oily skin)
- Loss of muscle function or feeling
- Muscle atrophy
- Memory loss
- Drooling
- Anxiety, stress, and tension

Signs and tests

The health care provider may be able to diagnose Parkinson's disease based on the symptoms and physical examination. However, the symptoms may be difficult to assess, particularly in the elderly. For example, the tremor may not appear when the person is sitting quietly with arms in the lap. The posture changes may be similar to osteoporosis or other changes associated with aging. Lack of facial expression may be a sign of depression.

An examination may show "cogwheel" rigidity (jerky, stiff movements), tremors of the Parkinson's type, and difficulty initiating or completing voluntary movements. Reflexes are essentially normal.

Tests are not usually specific for Parkinson's, but they may be required to rule out other disorders that cause similar symptoms. See also essential tremor.

Treatment

There is no known cure for Parkinson's disease. The goal of treatment is to control symptoms.

Medications control symptoms primarily by increasing the levels of dopamine in the brain. The type of medication, the dose, the amount of time between doses, or the combination of medications used may need to be adjusted as symptoms change. Many medications can cause severe side effects, so monitoring and follow-up by the health care provider is important.

Types of medication:

- Deprenyl may provide some improvement to mildly affected patients.
- Amantadine or anticholinergic medications may be used to reduce early or mild tremors.
- Levodopa is a medication that the body converts to a brain transmitter called dopamine. It may be used to increase the body's supply of dopamine, which may improve movement and balance.
- Carbidopa is a medication that reduces the side effects of levodopa and makes it work better.
- Entacapone is a medication used to prevent the breakdown of levodopa.
- Pramipexole and ropinirole are dopamine medications used before or together with levodopa.
- Rasagiline is a medicine recently approved for patients with early Parkinson's disease. It may also be combined with levodopa in patients with more advanced cases of the disease. Rasagiline helps block the breakdown of dopamine.

Additional medications to help reduce symptoms or control side effects of primary treatment medications include antihistamines, antidepressants, dopamine agonists, monoamine oxidase inhibitors (MAOIs), and others.

Good general nutrition and health are important. Exercise should continue, with the level of activity adjusted to meet the changing energy levels that may occur. Regular rest periods and avoidance of stress are recommended, because fatigue or stress can make symptoms worse. Physical therapy, speech therapy, and occupational therapy may help promote function and independence.

Railings or banisters placed in commonly used areas of the house may be of great benefit to the person experiencing difficulties with daily living activities. Special eating utensils may also be helpful.

Social workers or other counseling services may help the patient cope with the disorder and with obtaining

assistance (such as Meals-on-Wheels) as appropriate.

Experimental or less common treatments may be recommended. For example, surgery to implant stimulators or destroy tremor-causing tissues may reduce symptoms in some people. Transplantation of adrenal gland tissue to the brain has been attempted, with variable results.

Support Groups

Emotional support for the person with Parkinson's disease and everyone involved may help in coping with the changes caused by the disease. This may include the National Parkinson's Foundation or another group. See Parkinson's disease - support group.

Expectations (prognosis)

Untreated, the disorder progresses to total disability, often accompanied by general deterioration of all brain functions, and may lead to an early death.

Treated, the disorder impairs people in varying ways. Most people respond to some extent to medications. The extent of symptom relief, and how long this control of symptoms lasts, is highly variable. The side effects of medications may be severe.

Complications

- Varying degrees of disability
- Difficulty swallowing or eating
- Difficulty performing daily activities
- Injuries from falls
- Side effects of medications

Calling your health care provider

Call your health care provider if symptoms of Parkinson's disease appear, if symptoms get worse, or if new symptoms occur. Also tell the health care provider about any possible side effects of medications, which may include:

- Involuntary movements
- Nausea and vomiting
- Dizziness
- Changes in alertness, behavior or mood
- Severe confusion or disorientation
- Delusional behavior
- Hallucinations
- Loss of mental functions

Also call your health care provider if the condition gets worse and the caregiver is unable to care for the person at home.

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